4(a)

One mark per bullet point

- input of adult and child number
- calculation of total without discount
- check if total people are 6 or more
- … apply discount to total
- output of the total

Example:

```
OUTPUT "Please enter the number of adults "
INPUT Adult
OUTPUT "Please enter the number of children "
INPUT Child
Total ← (Adult * 9.99) + (Child * 6.99)
IF (Adult + Child) >= 6
  THEN
    Total ← Total – (Total * 15/100)
ENDIF
OUTPUT "The total cost is ", Total
```

4(b)

One mark per bullet point

- Correct use of `ROUND`
- … to 2 decimal places

Example

```
Total ← ROUND(Total, 2)
```

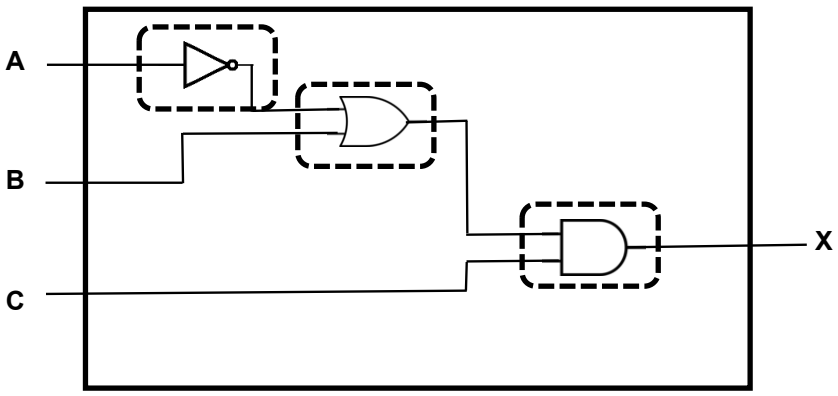
4(c)(i)

One mark per bullet point

- **(** NOT **A** OR **B)**
- AND **C**

(X =) (NOT **A** OR **B)** AND **C**

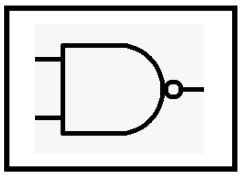
4(c)(ii)



One mark per correct gate

4(d)

- **One** mark for correct symbol
- **One** mark for correctly completed table



A	B	X
0	0	1
0	1	1
1	0	1
1	1	0

8

Use the tables for AO2 and AO3 below to award a mark in a suitable band using a best fit approach, then add up the total. Marks are available for:

- AO2 (maximum 9 marks)
- AO3 (maximum 6 marks)

Data Structures required with names as given in the scenario:
Arrays or lists `RandomNumber[]`, `CountedNumber[]`

Requirements (techniques)

R1 arrays and variables declared, then 100 000 random integers between 1 and 10, inclusive, generated and stored in an array, (array and variable declarations, iteration, random number generation, rounding and storage).
R2 frequency of each random integer counted and results stored in array, then results sorted into descending order (initialisation, selection, counting, sort, nested iteration, storage).
R3 calculation of the chance of each random integer occurring rounded to 4 d.p. and results output (iteration, rounding and output).

Example 15-mark answer in pseudocode

```
// array and variable declaration
DECLARE RandomNumber : ARRAY[1:100000] OF INTEGER
DECLARE CountedNumber : ARRAY[1:10, 1:2] OF INTEGER
DECLARE Index1 : INTEGER
DECLARE Index2 : INTEGER
DECLARE Swap : BOOLEAN
DECLARE Temp1 : INTEGER
DECLARE Temp2 : INTEGER
// generate 100000 random integers between 1 and 10, inclusive,
// and store them in an array
FOR Index1 ← 1 TO 100000
    RandomNumber[Index1] ← ROUND(RANDOM() * 9, 0) + 1
NEXT Index1
```

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```
// initialising the CountedNumber array
FOR Index1 ← 1 TO 10
    CountedNumber[Index1, 1] ← Index1
    CountedNumber[Index1, 2] ← 0
NEXT Index1
// counting the frequency of each of the random integers
// and storing the frequencies in an array
FOR Index1 ← 1 TO 10
    FOR Index2 ← 1 TO 100000
        IF RandomNumber[Index2] = CountedNumber[Index1, 1]
          THEN
            CountedNumber[Index1, 2] ← CountedNumber[Index1, 2] + 1
        ENDIF
    NEXT Index2
NEXT Index1
// performing sort on frequencies, so the possible random numbers
// are stored in descending order of frequency
Swap ← TRUE
WHILE Swap DO
    // sort is terminated when no swaps take place during a pass
    Swap ← FALSE
    FOR Index1 ← 1 TO 9
        IF CountedNumber[Index1, 2] < CountedNumber[Index1 + 1, 2]
          THEN
            Temp1 ← CountedNumber[Index1, 1]
            Temp2 ← CountedNumber[Index1, 2]
            CountedNumber[Index1, 1] ← CountedNumber[Index1 + 1, 1]
            CountedNumber[Index1, 2] ← CountedNumber[Index1 + 1, 2]
            CountedNumber[Index1 + 1, 1] ← Temp1
            CountedNumber[Index1 + 1, 2] ← Temp2
            Swap ← TRUE
        ENDIF
    NEXT Index1
ENDWHILE
```

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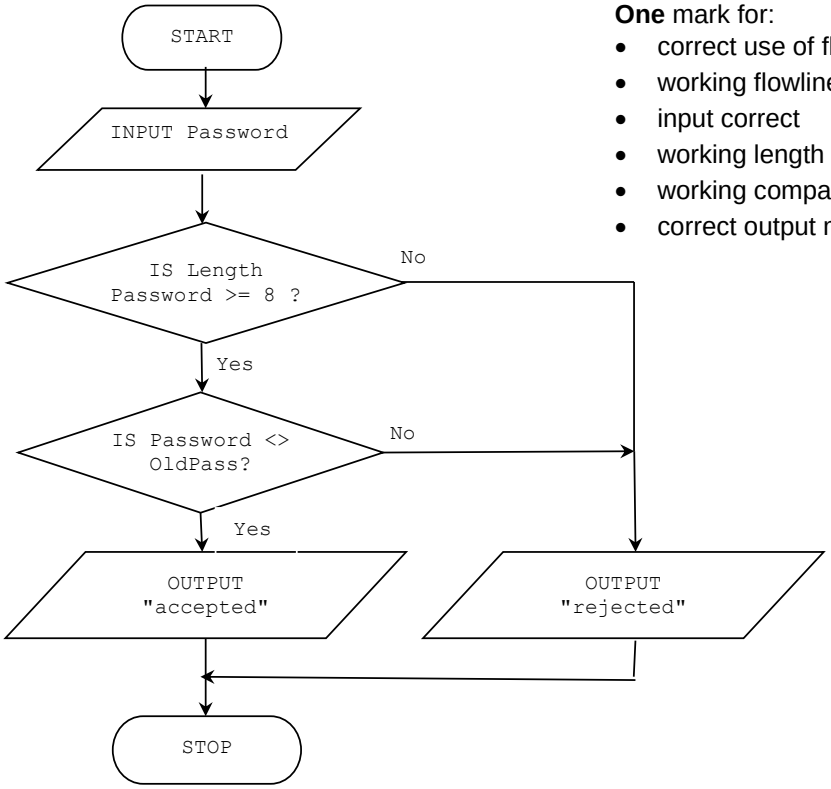
```
// outputting the results, with chances for each random number
// calculated to 4 d.p.
// results in descending order of frequency
FOR Index1 ← 1 TO 10
    OUTPUT "The chance of ", CountedNumber[Index1, 1], " occurring is: "
    OUTPUT ROUND(CountedNumber[Index1, 2]/100000, 4)
NEXT Index1
```

Alternative answer for first 20 lines after declarations, where `RandomNumber[]` is populated and frequency counted in the same loop.

```
// initialising the CountedNumber array
FOR Index1 ← 1 TO 10
    CountedNumber[Index1, 1] ← Index1
    CountedNumber[Index1, 2] ← 0
NEXT Index1
// generate random integers in an array,
// counting and storing the frequencies in an array
FOR Index1 ← 1 TO 100000
    Temp1 ← ROUND(RANDOM() * 9, 0) + 1
    RandomNumber[Index1] ← Temp1
    CountedNumber[Temp1, 2] ← CountedNumber[Temp1, 2] + 1
NEXT Index1
// performing sort on frequencies, so the possible random numbers
```

8(a)



One mark for:
- correct use of flowchart symbols
- working flowlines
- input correct
- working length check
- working comparison
- correct output messages

8(b)

One mark for each point
- `OPENFILE MyPassword.txt FOR WRITE`
- `WRITEFILE MyPassword.txt, Password`
- `CLOSEFILE MyPassword.txt`

8(c)

One mark for each point
- needs to be retrieved on demand // saved for a later date
- storage must be non-volatile